WHAT IS CLAIMED IS:

1. An active MOS or CMOS sensor comprising:

   A) a crystalline substrate,

   B) a charge generating photoconducting layer comprised of at lease two layers of charge generating material for converting the light into electrical charges,

   C) a plurality of MOS or CMOS pixel circuits fabricated in said substrate below said charge generating layer, each pixel circuit comprising a charge collecting electrode, a capacitor and at least two transistors, said pixel circuits being arranged to collect and read out charges generated in said charge generating layers,

   D) a surface electrode in the form of a thin transparent layer or grid located above said layer of charge generating material, and

   E) an electrical source for providing a voltage drop across said charge generating photoconducting layer.

2. The sensor as in Claim 1 wherein said plurality of MOS or CMOS pixel circuits is a plurality of CMOS pixel circuits.

3. The sensor as in Claim 1 wherein a metal pad is used as the charge collecting electrode in each said pixel.

4. The sensor as in Claim 1 wherein said plurality of pixels is at least 0.1 million pixels.

5. The sensor as in Claim 1 and further comprising additional MOS or CMOS circuits in and/or on the same crystalline substrate with said active sensor

array for converting into images charges read out by said pixel circuits.

6. The sensor as in Claim 1 wherein said layer of charge generating material comprises a p-doped layer, an intrinsic layer and an n-layer.

7. The sensor as in Claim 6 wherein said surface electrode is comprised of ITO.

8. The sensor as in Claim 6 wherein said n-layer is located adjacent to said surface electrode and said p-layer is located adjacent to charge collecting electrode.

9. The sensor as in Claim 6 and further comprising a barrier layer between said p-layer and said i-layer.

10. The sensor as Claim in 8 wherein said p-layer comprises carbon atoms or molecules.

11. The sensor as in Claim 1 wherein each pixel circuit of said plurality of pixel circuits further comprises a gate bias transistor separating said charge collecting electrode from said capacitor.

12. The sensor as in Claim 6 wherein each pixel circuit of said plurality of pixel circuits further comprises a gate bias transistor separating said charge collecting electrode from said capacitor.

13. The sensor as in Claim 12 wherein the gate bias transistor is held at a constant voltage.

14. The sensor as in Claim 1 and further comprising an interconnect structure formed above said crystalline substrate and below said charge generating layer.

15. The sensor as in Claim 14 wherein said interconnect structure comprises at least two sublayers each comprising conducting vias providing electrical communication between said plurality of pixel circuits and said charge generating layer.

16. The sensor as in Claim 1 and also comprising data analyzing circuits fabricated on said crystalline substrate.

17. The sensor as in Claim 16 and also comprising image manipulation circuits fabricated on said crystalline substrate.

18. The sensor as in Claim 17 and also comprising decision and control circuits fabricated on said crystalline substrate.

19. The sensor as in Claim 18 and also comprising communication circuits fabricated on said crystalline substrate.

20. The sensor as in Claim 1 wherein said array is an integral part of a camera attached by a cable to a cellular phone.

21. The sensor as in Claim 1 wherein said surface electrode is comprised of a layer of indium tin oxide.

22. The sensor as in Claim 1 wherein said at least two layers of said charge generating layer are comprised primarily of hydrogenated amorphous silicon.

23. The sensor as in Claim 1 wherein said at least two layers of said charge generating layers are comprised of micro crystalline silicon or micro crystalline Si(Ge).

24. The sensor as in Claim 1 and further comprising a protective layer.

25. The sensor as in Claim 1 and further comprising circuitry for locating defective pixels and substituting normalized data for the defective pixels.

26. The sensor as in Claim 1 wherein said array in an integral part of a camera in a cellular phone.

27. The sensor as in Claim 1 and further comprising an array of color filters located on top of said surface electrode.

28. The sensor as in Claim 27 wherein said color filters are comprised of red, green and blue filters arranged in four color quadrants of two green, one red and one blue.

29. The sensor as in Claim 1 wherein said sensor is a part of a camera fabricated in to form of a human eyeball.

30. The sensor as in Claim 18 wherein said decision and control circuits comprise a processor programmed with a control algorithm for analyzing pixel data and based on that data controlling signal output from said sensor array.

31. The sensor as in Claim 30 wherein said processor controls signal output by adjusting pixel illumination time.

32. The sensor as in Claim 30 wherein said processor controls signal output by adjusting signal amplification.

33. The sensor as in Claim 1 wherein said sensor is a part of a camera incorporated into a device chosen from the following group:

- Analog camcorder
- Digital camcorder

- Security camera
- Digital still camera
- Personal computer camera
- Toy
- Endoscope
- Military unmanned aircraft, bomb and missile
- Sports equipment
- High definition Television sensor.

34. A camera with a MOS or CMOS based active sensor array for producing electronic images from charge producing light, said camera comprising:

A) a crystalline substrate,

B) a charge generating photoconducting layer comprised of at lease two layers of charge generating material for converting the light into electrical charges,

C) a plurality of MOS or CMOS pixel circuits fabricated in said substrate below said charge generating layer, each pixel circuit comprising a charge collecting electrode, a capacitor and at least three transistors, said pixel circuits being arranged to collect and read out charges generated in said charge generating layers,

D) a surface electrode in the form of a thin transparent layer or grid located above said layer of charge generating material,

E) an electrical source for providing a reverse bias across said charge

generating photoconducting layer,

F) additional MOS or CMOS circuits in and/or on the same crystalline substrate with said active sensor array for converting the charges into images,

120 G) additional MOS or CMOS circuits in and/or on the same crystalline substrate with said active sensor array for timing and signal synchronization, and

H) focusing optics for focusing electron-hole producing light onto said active sensor array.